# PMBT2907,215 Datasheet


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| | |
|---|---|
| DiGi Electronics Part Number | PMBT2907,215-DG |
| Manufacturer | Nexperia USA Inc. |
| Manufacturer Product Number | PMBT2907,215 |
| Description | TRANS PNP 40V 0.6A TO236AB |
| Detailed Description | Bipolar (BJT) Transistor PNP 40 V 600 mA 200MHz 250 mW Surface Mount TO-236AB |

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RFQ Email: Info@DiGi-Electronics.com

## Purchase and inquiry

| Manufacturer Product Number: | Manufacturer: |
| --- | --- |
| PMBT2907,215 | Nexperia USA Inc. |
| Series: | Product Status: |
| - | Active |
| Transistor Type: | Current - Collector (Ic) (Max): |
| PNP | 600 mA |
| Voltage - Collector Emitter Breakdown (Max): | Vce Saturation (Max) @ Ib, Ic: |
| 40 V | 1.6V @ 50mA, 500mA |
| Current - Collector Cutoff (Max): | DC Current Gain (hFE) (Min) @ Ic, Vce: |
| 20nA (ICBO) | 100 @ 150mA, 10V |
| Power - Max: | Frequency - Transition: |
| 250 mW | 200MHz |
| Operating Temperature: | Grade: |
| 150°C (TJ) | Automotive |
| Qualification: | Mounting Type: |
| AEC-Q101 | Surface Mount |
| Package / Case: | Supplier Device Package: |
| TO-236-3, SC-59, SOT-23-3 | TO-236AB |
| Base Product Number: | |
| PMBT2907 | |

## Environmental & Export classification

| RoHS Status: | Moisture Sensitivity Level (MSL): |
| --- | --- |
| ROHS3 Compliant | 1 (Unlimited) |
| REACH Status: | ECCN: |
| REACH Unaffected | EAR99 |
| HTSUS: | |
| 8541.21.0075 | |

# PMBT2907

## 40V, 600 mA, PNP switching transistor

**6 March 2015** **Product data sheet**

## 1. General description

PNP switching transistor in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

NPN complement: PMBT2222

60V variant: PMBT2907A

## 2. Features and benefits

- Single general-purpose switching transistor
- AEC-Q101 qualified

## 3. Applications

- Switching and linear amplification

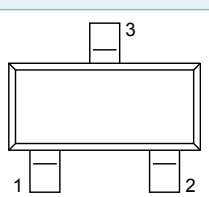
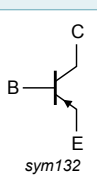
## 4. Quick reference data

**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{CEO}$ | collector-emitter voltage | open base | | - | - | -40 | V |
| $I_C$ | collector current | | | - | - | -600 | mA |
| $h_{FE}$ | DC current gain | $V_{CE}$ = -10 V; $I_C$ = -150 mA; $T_{amb}$ = 25 °C | | 100 | - | 300 | |

## 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | B | base |   **TO-236AB (SOT23)** |   *sym132* |
| 2 | E | emitter | | |
| 3 | C | collector | | |

# 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| PMBT2907 | TO-236AB | plastic surface-mounted package; 3 leads | SOT23 |

# 7. Marking

**Table 4. Marking codes**

| Type number | Marking code [1] |
|---|---|
| PMBT2907 | %2B |

[1] % = placeholder for manufacturing site code

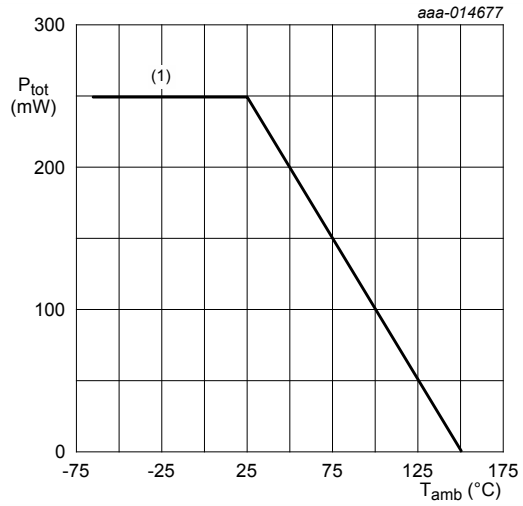
# 8. Limiting values

**Table 5. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134).*

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CBO}$ | collector-base voltage | open emitter | | - | -60 | V |
| $V_{CEO}$ | collector-emitter voltage | open base | | - | -40 | V |
| $V_{EBO}$ | emitter-base voltage | open collector | | - | -5 | V |
| $I_C$ | collector current | | | - | -600 | mA |
| $I_{CM}$ | peak collector current | single pulse; $t_p \leq 1$ ms | | - | -800 | mA |
| $I_{BM}$ | peak base current | | | - | -200 | mA |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C | [1] | - | 250 | mW |
| $T_j$ | junction temperature | | | - | 150 | °C |
| $T_{amb}$ | ambient temperature | | | -65 | 150 | °C |
| $T_{stg}$ | storage temperature | | | -65 | 150 | °C |

[1] Transistor mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.




(1) FR4 PCB; standard footprint

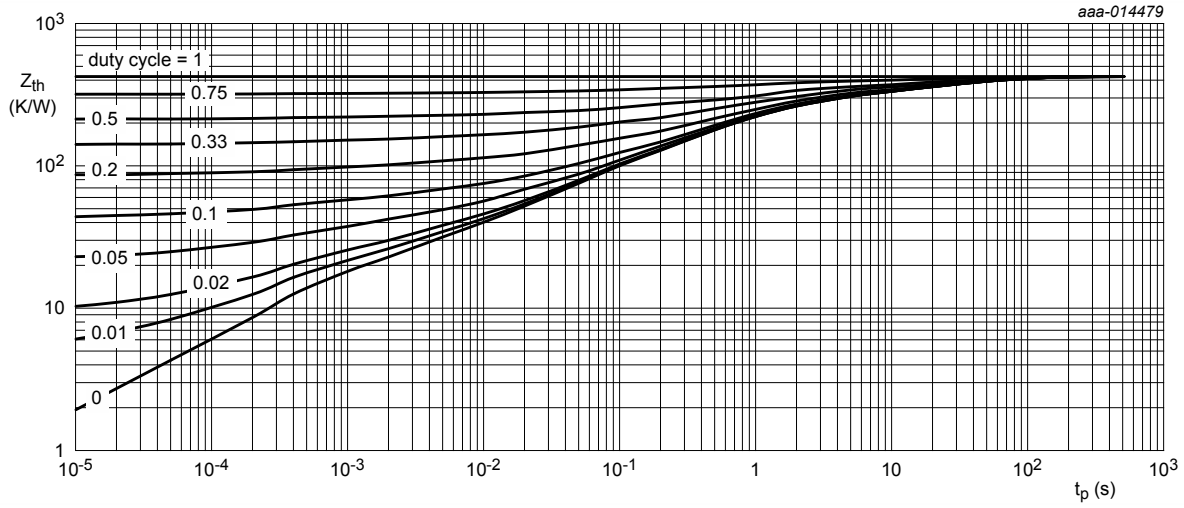
**Fig. 1. Power derating curve**

# 9. Thermal characteristics

**Table 6. Thermal characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] | - | - | 500 | K/W |

[1] Transistor mounted on an FR4 printed-circuit board, single-sided copper, tin-plated and standard footprint.



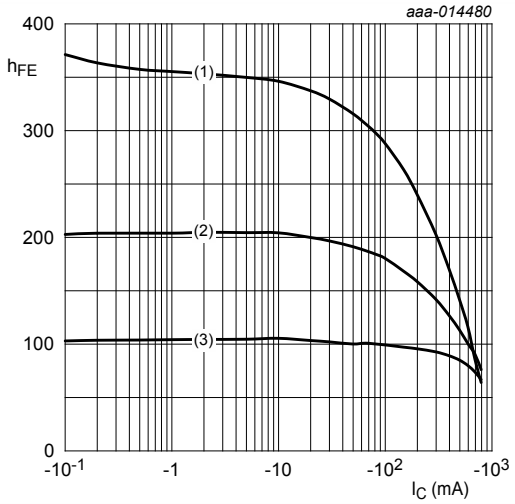

Mounted on FR4 PCB; standard footprint.

**Fig. 2. Transient thermal impedance as a function of pulse time; typical values**

## 10. Characteristics

**Table 7. Characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_{CBO}$ | collector-base cut-off current | $V_{CB}$ = -50 V; $I_E$ = 0 A; $T_{amb}$ = 25 °C | | - | - | -20 | nA |
| | | $V_{CB}$ = -50 V; $I_E$ = 0 A; $T_j$ = 125 °C | | - | - | -20 | µA |
| $I_{EBO}$ | emitter-base cut-off current | $V_{EB}$ = -5 V; $I_C$ = 0 A; $T_{amb}$ = 25 °C | | - | - | -50 | nA |
| $h_{FE}$ | DC current gain | $V_{CE}$ = -10 V; $I_C$ = -0.1 mA; $T_{amb}$ = 25 °C | | 35 | - | - | |
| | | $V_{CE}$ = -10 V; $I_C$ = -1 mA; $T_{amb}$ = 25 °C | | 50 | - | - | |
| | | $V_{CE}$ = -10 V; $I_C$ = -10 mA; $T_{amb}$ = 25 °C | | 75 | - | - | |
| | | $V_{CE}$ = -10 V; $I_C$ = -150 mA; $T_{amb}$ = 25 °C | | 100 | - | 300 | |
| | | $V_{CE}$ = -10 V; $I_C$ = -500 mA; $T_{amb}$ = 25 °C | | 30 | - | - | |
| $V_{CEsat}$ | collector-emitter saturation voltage | $I_C$ = -150 mA; $I_B$ = -15 mA; $T_{amb}$ = 25 °C | | - | - | -400 | mV |
| | | $I_C$ = -500 mA; $I_B$ = -50 mA; $T_{amb}$ = 25 °C | | - | - | -1.6 | V |
| $V_{BEsat}$ | base-emitter saturation voltage | $I_C$ = -150 mA; $I_B$ = -15 mA; $T_{amb}$ = 25 °C | | - | - | -1.3 | V |
| | | $I_C$ = -500 mA; $I_B$ = -50 mA; $T_{amb}$ = 25 °C | | - | - | -2.6 | V |
| $t_d$ | delay time | $I_C$ = -150 mA; $I_{Bon}$ = -15 mA; $I_{Boff}$ = 15 mA; $T_{amb}$ = 25 °C | | - | - | 12 | ns |
| $t_r$ | rise time | | | - | - | 30 | ns |
| $t_{on}$ | turn-on time | | | - | - | 40 | ns |
| $t_s$ | storage time | | | - | - | 300 | ns |
| $t_f$ | fall time | | | - | - | 65 | ns |
| $t_{off}$ | turn-off time | | | - | - | 365 | ns |
| $C_C$ | collector capacitance | $V_{CB}$ = -10 V; $I_E$ = 0 A; $i_e$ = 0 A; f = 1 MHz; $T_{amb}$ = 25 °C | | - | - | 8 | pF |
| $C_E$ | emitter capacitance | $V_{EB}$ = -2 V; $I_C$ = 0 A; $i_c$ = 0 A; f = 1 MHz; $T_{amb}$ = 25 °C | | - | - | 30 | pF |
| $f_T$ | transition frequency | $V_{CE}$ = -20 V; $I_C$ = -50 mA; f = 100 MHz; $T_{amb}$ = 25 °C | | 200 | - | - | MHz |



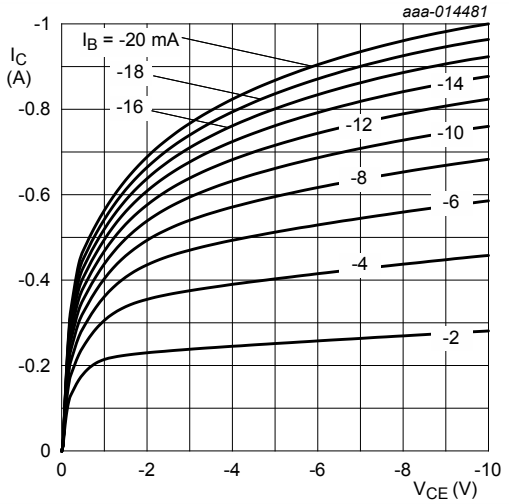

$V_{CE}$ = -10 V

(1) $T_{amb}$ = 150 °C

(2) $T_{amb}$ = 25 °C

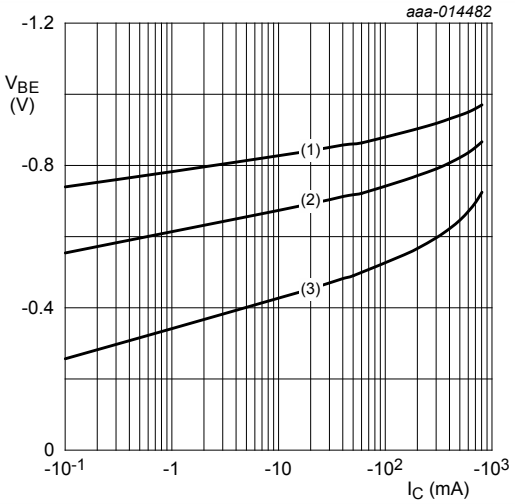
(3) $T_{amb}$ = −55 °C

**Fig. 3. DC current gain as a function of collector current; typical values**




$T_{amb}$ = 25 °C

**Fig. 4. Collector current as a function of collector-emitter voltage; typical values**



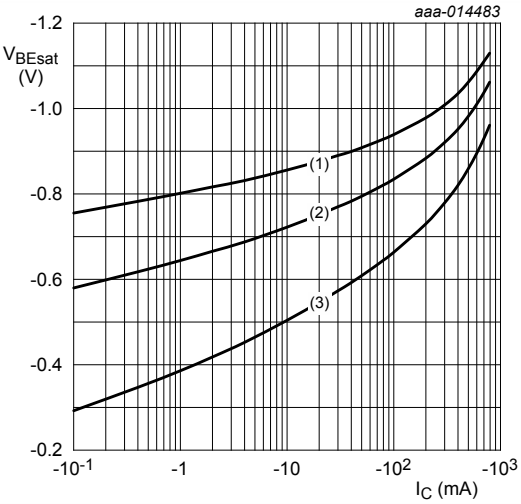

$V_{CE}$ = -10 V

(1) $T_{amb}$ = −55 °C

(2) $T_{amb}$ = 25 °C

(3) $T_{amb}$ = 150 °C

**Fig. 5. Base-emitter voltage as a function of collector current; typical values**



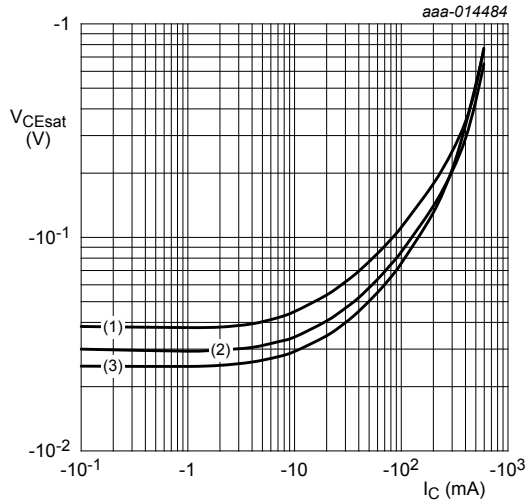

$I_C/I_B$ = 10

(1) $T_{amb}$ = −55 °C

(2) $T_{amb}$ = 25 °C

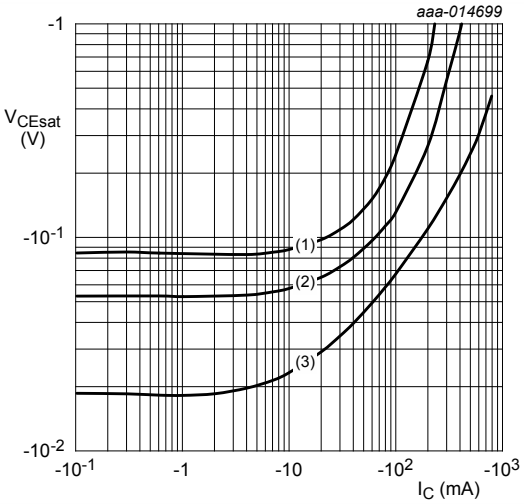
(3) $T_{amb}$ = 150 °C

**Fig. 6. Base-emitter saturation voltage as a function of collector current; typical values**




$I_C/I_B$ = 20
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 25 °C
(3) $T_{amb}$ = −55 °C

**Fig. 7. Collector-emitter saturation voltage as a function of collector current; typical values**




$T_{amb}$ = 25 °C
(1) $I_C/I_B$ = 100
(2) $I_C/I_B$ = 50
(3) $I_C/I_B$ = 10

**Fig. 8. Collector-emitter saturation voltage as a function of collector current; typical values**

# 11. Test information

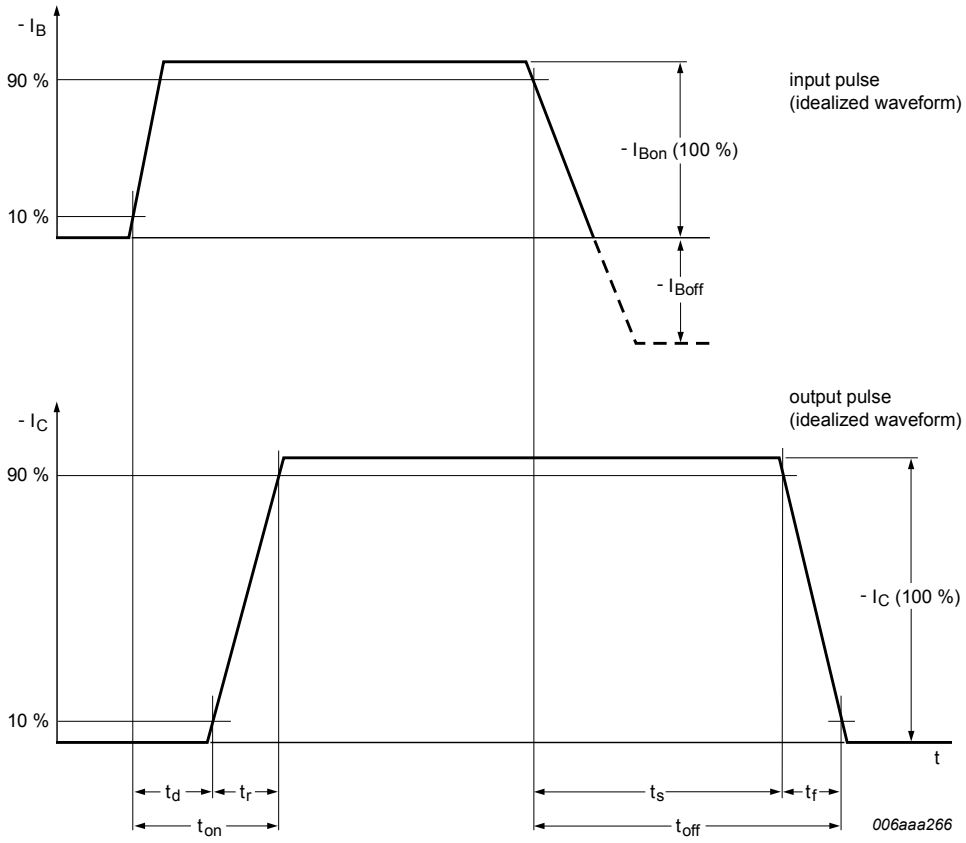



**Fig. 9. BISS transistor switching time definition**

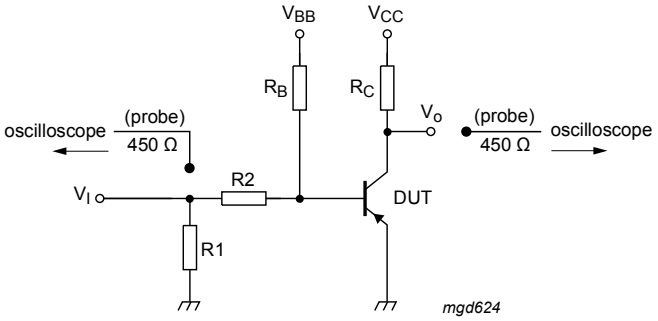


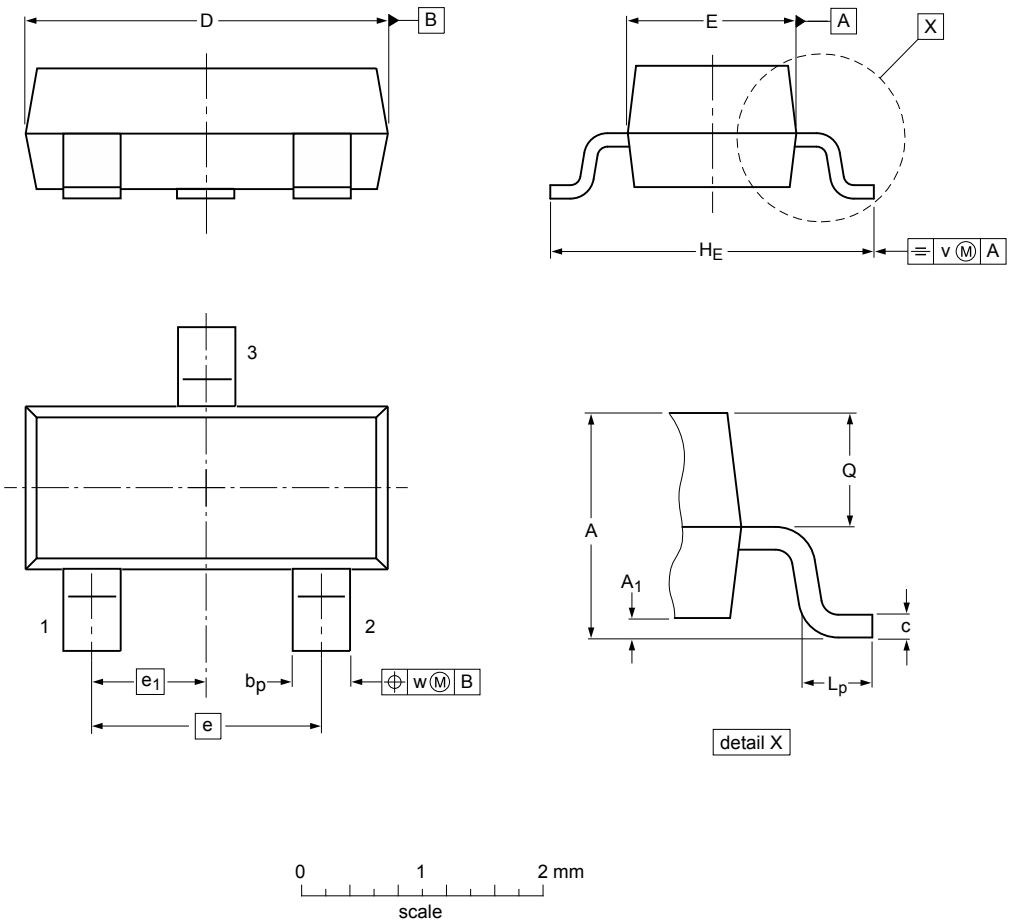

**Fig. 10. Test circuit for switching times**

## 11.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101 - Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

## 12. Package outline

**Plastic surface-mounted package; 3 leads** **SOT23**




Dimensions (mm are the original dimensions)

| Unit | | A | $A_1$ | $b_p$ | c | D | E | e | $e_1$ | $H_E$ | $L_p$ | Q | v | w |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 1.1 | 0.1 | 0.48 | 0.15 | 3.0 | 1.4 | | | 2.5 | 0.45 | 0.55 | | |
| | nom | | | | | | | 1.9 | 0.95 | | | | 0.2 | 0.1 |
| | min | 0.9 | | 0.38 | 0.09 | 2.8 | 1.2 | | | 2.1 | 0.15 | 0.45 | | |

*sot023_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT23 | | TO-236AB | | | | ~~14-06-19~~ 14-09-22 |

**Fig. 11. Package outline TO-236AB (SOT23)**

# 13. Soldering

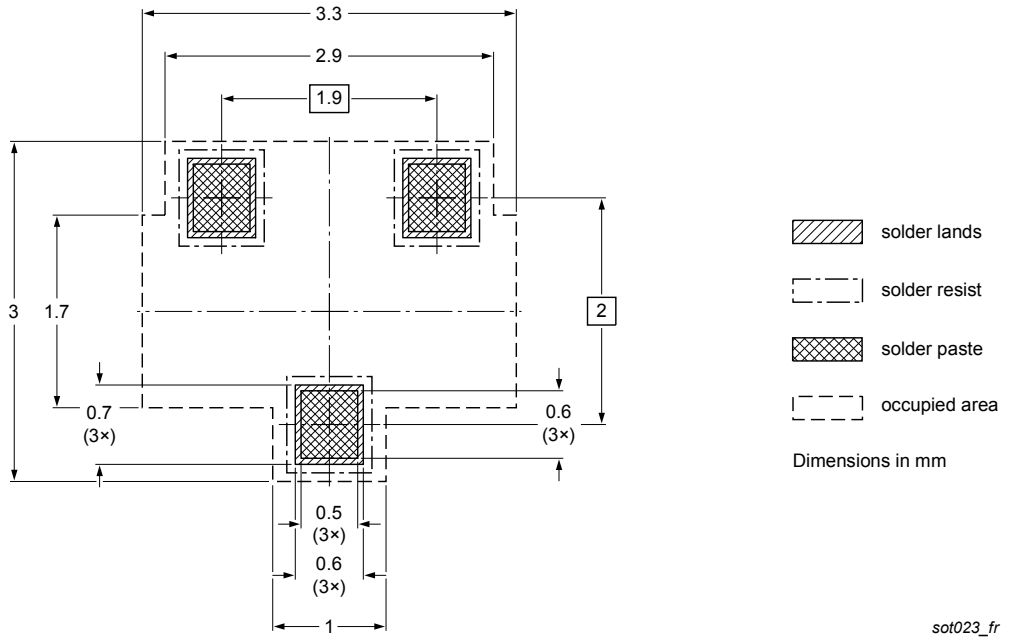



**Fig. 12. Reflow soldering footprint for TO-236AB (SOT23)**

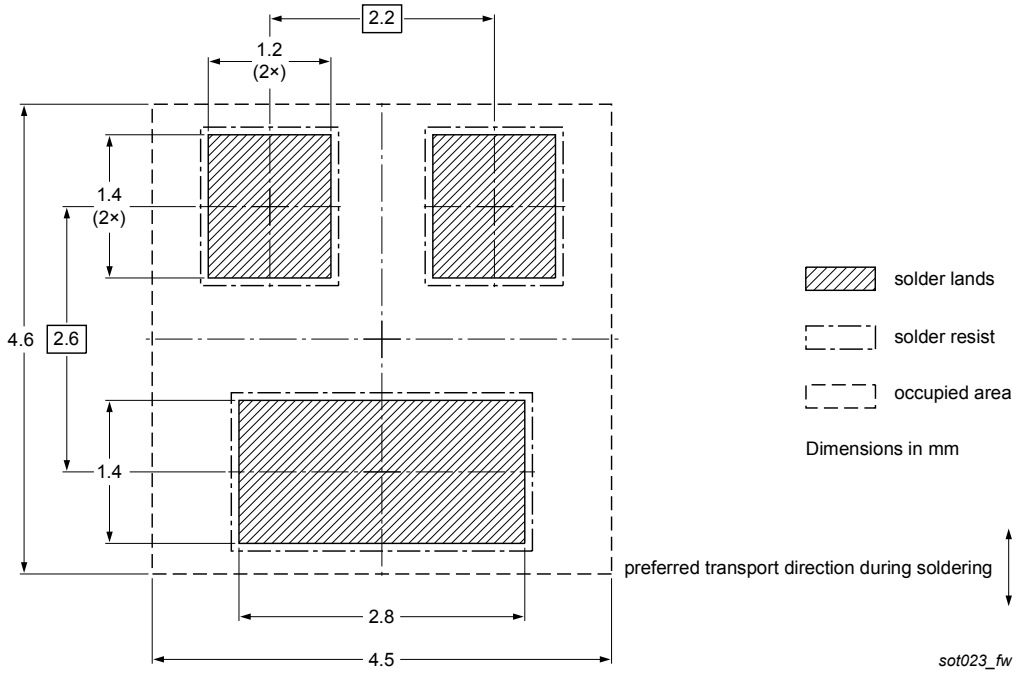



**Fig. 13. Wave soldering footprint for TO-236AB (SOT23)**

# 14. Revision history

**Table 8. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| PMBT2907 v.5 | 20150306 | Product data sheet | - | PMBT2907_ PMBT2907A v.4 |
| Modifications: | • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors<br>• Legal texts have been adapted to the new company name where appropriate<br>• Data sheet PMBT29007_PMBT2907A split into two separate data sheets | | | |
| PMBT2907_ PMBT2907A v.4 | 20040116 | Product data sheet | - | PMBT2907_ PMBT2907A v.3 |
| PMBT2907_ PMBT2907A v.3 | 19990427 | Product specification | - | PMBT2907_ PMBT2907A v.2 |
| PMBT2907_ PMBT2907A v.2 | 19970904 | Product specification | - | PMBT2907_ PMBT2907A v.1 |
| PMBT2907_ PMBT2907A v.1 | 19970507 | Product specification | - | - |

# 15. Legal information

## 15.1 Data sheet status

| Document status [1][2] | Product status [3] | Definition |
|---|---|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nexperia.com.

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# 16. Contents





For more information, please visit: http://www.nexperia.com
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**Date of release: 06 March 2015**

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